

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Gopinath Chappidi

Appl. No.: 10/708,902

Date Filed: 03/30/2004

For: Identifying the Location of an Asset

Art Unit: 2876

Examiner: WALSH, Daniel I

Attorney Docket No.: H0006030

**RECEIVED
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This reply is filed accompanying the petition for revival of an application for patent abandoned unintentionally under 37 CFR § 1.137(b). This is also in response to the Office Action dated 11/02/2004.

Amendments to the claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks begin at page number 9 of this paper.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to Deposit Account No.: 20-0674.

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Listing of Claims

1 Claim 1 (Currently Amended): A tracking system to track the location of a plurality
2 of assets of interest, said tracking system comprising:

3 a set of asset badges, wherein each of said set of asset badges is attached to a
4 corresponding one of a first set of assets and transmits a corresponding badge identifier,

5 a plurality of intelligent badges, wherein each of said plurality of intelligent badges
6 is attached to a corresponding one of a second set of assets and transmits a corresponding
7 badge identifier, wherein said first set of assets and said second set of assets are comprised
8 in said plurality of assets;

9 each of said plurality of intelligent badges receiving a corresponding one of a
10 plurality of sets of badge identifiers, each of said plurality of intelligent badges sending said
11 corresponding one of a plurality of sets of badge identifiers associated with a badge identifier
12 of the intelligent badge, wherein the badge identifiers in each set are sent together associated
13 with the badge identifier of the intelligent badge even if the badge identifiers in the set are
14 received at different time instances; and

15 a processing system receiving and processing said plurality of sets of badge
16 identifiers and corresponding identifiers of said intelligent badges to determine a relative
17 location of each of said plurality of assets of interest.

1 Claim 2 (Currently Amended): The tracking system of claim 1, further comprising
2 a reader receiving each of said plurality of sets of badge identifiers and said associated badge
3 identifier from a corresponding one of said plurality of intelligent badges, said reader
4 sending said plurality of sets of badge identifiers and said associated badge identifiers to said
5 processing system, wherein said reader is associated with a reader zone, said reader zone
6 containing said intelligent physical zones.

1 Claim 3 (Currently Amended) The tracking system of claim 2, wherein a first set of
2 badge identifiers and a second set of badge identifiers contain at least one common badge
3 identifier, wherein said processing system determines said relative physical location of a
4 common badge by identifying said at least one common badge identifier, wherein said first

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5 set and said second set are received from different intelligent badges and comprised in said
6 plurality of sets of badge identifiers.

1 Claim 4 (Currently Amended): The tracking system of claim 3, further comprising
2 a reference badge positioned at a known location in an area where said plurality of assets are
3 located, wherein said reference badge also transmits a reference badge identifier, wherein
4 a first intelligent badge contained in said plurality of intelligent badges receives said
5 reference badge identifier and sends said reference badge identifier to said processing system
6 via said reader, wherein said processing system determines the physical location of a first
7 intelligent physical zone of said first intelligent badge, and thus the location of each of said
8 plurality of assets relative to said known location.

1 Claim 5 (Original): The tracking system of claim 4, wherein each of said set of asset
2 badges sends the corresponding identifier in both a radio-frequency (RF) signal and an
3 infrared (IR) signal, wherein the identifier encoded in said RF signal is received by said
4 reader and the identifier encoded in said IR signal is received by one or more of said
5 plurality of intelligent badges.

1 Claim 6 (Currently Amended): The tracking system of claim 3, further comprising:
2 a set of component badges, wherein said set of component badges are attached to
3 corresponding one of a fourth set of assets; and
4 a set of active badges, wherein each of said set of active badges is attached to a
5 corresponding one of a third set of assets, wherein said third set of assets and said fourth set
6 of assets are contained in said plurality of assets,
7 wherein a first active badge receives each of a set of component badge identifiers
8 from a corresponding one of said set of component badges, wherein said set of component
9 badge identifiers and a first active badge identifier is sent by said first active badge to a first
10 intelligent badge contained in one of said plurality of intelligent badges, wherein said first
11 active badge identifier identifies said first active badge and said first active badge is
12 contained in said set of active badges,

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13 wherein said processing system receives said first active badge identifier associated
14 with a said set of component badge identifiers from said first intelligent badge, said
15 processing system determining the relative location of said first active badge by treating said
16 first active badge identifier similar to each of said badge identifiers of said asset badges
17 similar to said determining of location of said plurality of assets, wherein the approximate
18 location of each of said fourth set of assets is same as the relative location of said first active
19 badge, wherein said processing system determines the location of said set of component
20 badges with reduced computational complexity.

1 Claim 7 (Original): The tracking system of claim 2, wherein each of said plurality of
2 sets of badge identifiers comprises the identifier of one of said intelligent badge or said
3 plurality of asset badges.

1 Claim 8 (Original): The tracking system of claim 2, wherein an intelligent badge is
2 attached to each of said plurality of assets of interest such that said relative location is
3 determined with more precision.

1 Claim 9 (Currently Amended): A computer readable medium carrying one or more
2 sequences of instructions for causing a processing system to determine a relative physical
3 location of each of a plurality of assets, wherein each of a set of asset badges is attached to
4 a corresponding one of a set of assets, wherein each of a plurality of intelligent badges is
5 attached to a corresponding asset, wherein said corresponding asset and said set of assets are
6 comprised in said plurality of assets, each of said plurality of intelligent badges being
7 associated with a corresponding intelligent physical zone, each of said plurality of intelligent
8 badges receiving a corresponding one of a plurality of sets of badge identifiers, the set of
9 badge identifiers received by an intelligent badge corresponding to asset badges located in
10 the intelligent physical zone of the intelligent badge, each of said plurality of intelligent
11 badges sending said corresponding one of a plurality of sets of badge identifiers associated
12 with a badge identifier of the intelligent badge, wherein execution of said one or more

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13 sequences of instructions by one or more processors contained in said processing system
14 causes said one or more processors to perform the actions of:

15 receiving said plurality of sets of badge identifiers and corresponding identifiers of
16 said plurality of intelligent badges, wherein the badge identifiers in each set are received
17 together associated with the badge identifier of the intelligent badge; and

18 examining said plurality of sets of badge identifiers and corresponding identifiers of
19 said plurality of intelligent badges to determine said relative physical location of each of said
20 plurality of assets of interest as being in one or more of said intelligent physical zones.

1 Claim 10 (Currently Amended): The computer readable medium of claim 9, wherein
2 a first set of badge identifiers and a second set of badge identifiers contain at least one
3 common badge identifier, wherein said processing system determines said relative physical
4 location of a common badge by identifying said at least one common badge identifier,
5 wherein said first set and said second set are comprised in said plurality of sets of badge
6 identifiers.

1 Claim 11 (Currently Amended): A method of tracking the location of a plurality of
2 assets of interest, said method comprising:

3 attaching each of a set of asset badges to a corresponding one of a first set of assets,
4 wherein each of said set of asset badges transmits a corresponding badge identifier,

5 attaching each of a plurality of intelligent badges to a corresponding one of a second
6 set of assets, wherein each of said plurality of intelligent badges also transmits a
7 corresponding badge identifier, wherein said first set of assets and said second set of assets
8 are comprised in said plurality of assets;

9 receiving each of a plurality of sets of badge identifiers in a corresponding one of said
10 plurality of intelligent badges;

11 transmitting from each intelligent badge a corresponding one of said plurality of sets
12 of badge identifiers along with a badge identifier of the intelligent badge, wherein the badge
13 identifiers in each set are sent together associated with the badge identifier of the intelligent
14 badge even if the badge identifiers in the set are received at different time instances; and

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15 processing in a processing system said plurality of sets of badge identifiers and
16 corresponding identifiers of said intelligent badges to determine a relative location of each
17 of said plurality of assets of interest.

1 Claim 12 (Currently Amended): The method of claim 11, wherein a first set of badge
2 identifiers and a second set of badge identifiers contain at least one common badge
3 identifier, wherein said processing determines said relative physical location by identifying
4 said at least one common badge identifier, wherein said first set and said second set are
5 received from different intelligent badges and comprised in said plurality of sets of badge
6 identifiers.

1 Claim 13 (Currently Amended): The method of claim 12, further comprising
2 positioning a reference badge at a known location in an area where said plurality of assets
3 are located, wherein said reference badge also transmits a reference badge identifier, wherein
4 a first intelligent badge contained in said plurality of intelligent badges receives said
5 reference badge identifier and sends said reference badge identifier, wherein said processing
6 determines the physical location of each of said plurality of assets relative to said known
7 location.

1 Claim 14 (Currently Amended): The method of claim 11, further comprising:
2 attaching each of a set of component badges to a corresponding one of a fourth set
3 of assets; and
4 a set of active badges, wherein each of said set of active badges is attached to a
5 corresponding one of a third set of assets, wherein said third set of assets and said fourth set
6 of assets are contained in said plurality of assets,
7 wherein a first active badge receives each of a set of component badge identifiers
8 from a corresponding one of said set of component badges, wherein said set of component
9 badge identifiers and a first active badge identifier is sent by said first active badge to a first
10 intelligent badge contained in one of said plurality of intelligent badges, wherein said first

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11 active badge identifier identifies said first active badge and said first active badge is
12 contained in said set of active badges,

13 wherein said processing system receives said first active badge identifier associated
14 with a said set of component badge identifiers from said first intelligent badge, said
15 processing system determining the relative location of said first active badge by treating said
16 first active badge identifier similar to each of said badge identifiers of said asset badges
17 ~~similar to said determining of location of said plurality of assets~~, wherein the approximate
18 location of each of said fourth set of assets is same as the relative location of said first active
19 badge, wherein said processing system determines the location of said set of component
20 badges with reduced computational complexity.

1 Claim 15 (Original): The method of claim 11, further comprising receiving in a
2 reader each of said plurality of sets of badge identifiers and said associated badge identifier
3 from a corresponding one of said plurality of intelligent badges, wherein said reader sends
4 said plurality of set of badge identifier to said processing system.

1 Claim 16 (New): The tracking system of claim 1, wherein each of said plurality of
2 intelligent badges is associated with a corresponding intelligent physical zone, the set of
3 badge identifiers received by an intelligent badge corresponding to asset badges located in
4 the intelligent physical zone of the intelligent badge, wherein a physical location of each of
5 said set of badges is determined as being in one or more of said intelligent physical zones
6 by said processing of said processing system.

1 Claim 17 (New): The tracking system of claim 2, wherein each of said asset badges
2 transmits corresponding badge identifier using a first type of signals suited for a first
3 distance range, and each of said plurality of intelligent badges sending said corresponding
4 one of said plurality of sets of badge identifiers associated with said badge identifier of the
5 intelligent badge using a second type of signals suited for a second distance range, wherein
6 said second distance range is more than said first distance range, and wherein said reader is

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7 located within a distance of said second distance range from each of said plurality of
8 intelligent badges.

1 Claim 18 (New): The method of claim 11, wherein each of said plurality of intelligent
2 badges is associated with a corresponding intelligent physical zone, the set of badge
3 identifiers received by an intelligent badge corresponding to asset badges located in the
4 intelligent physical zone of the intelligent badge, wherein a physical location of each of said
5 set of badges is determined as being in one or more of said intelligent physical zones by said
6 processing of said processing system.

1 Claim 19 (New): The method of claim 15, wherein each of said asset badges
2 transmits corresponding badge identifier using a first type of signals suited for a first
3 distance range, and each of said plurality of intelligent badges sending said corresponding
4 one of said plurality of sets of badge identifiers associated with said badge identifier of the
5 intelligent badge using a second type of signals suited for a second distance range, wherein
6 said second distance range is more than said first distance range, and wherein said reader is
7 located within a distance of said second distance range from each of said plurality of
8 intelligent badges.

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REMARKS

Claims 1-15 were examined in the outstanding office action mailed on 11/02/2004 (hereafter "Outstanding Office Action"). All claims 1-15 were rejected in the Outstanding Office Action. By virtue of this response, claims 1 - 4, 6 and 9 - 14 are sought to be amended without prejudice or disclaimer, and claims 16-19 are sought to be added. The amendments and additions are believed not to introduce new subject matter, and their entry is respectfully requested. Claims 1-19 are thus respectfully presented for reconsideration.

Information Disclosure Statement (IDS)

Applicant thanks the Examiner for considering and making of record the IDS filed in July 2004. The Examiner is also thanked for acknowledging the same in the Outstanding Office Action.

Telephone Interview

Applicants and the undersigned representative thank the Examiner for providing the opportunity to conduct the telephone interview on June 28, 2005. Only the undersigned representative and Examiner Walsh were present in the interview. A draft amendment containing some of the contents of this paper were sent in advance to the Examiner and discussed in the interview. No agreement appeared to have been reached.

Applicants rely on new features (not discussed in the Interview) in the present response, and regret/apologize for the overhead and inconvenience caused to the Examiner.

The Examiner had indicated that the Interview Summary Form PTOL-413 would be mailed in due course. It is respectfully requested that the completed form be mailed at the Examiner's earliest convenience, if one has not already been mailed.

The applicant is believed to have met the burden of making of record the Substance of the Interview. See MPEP 713.04 for further clarification.

25 Claim Rejections Under 35 U.S.C. § 103

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Claims 1-15 have been rejected under 35 U.S.C. 103 (a) as being unpatentable over United States Patent Application 20030137968 naming as inventor Lareau *et al* (Lareau). Claims 1-19, at least as amended are allowable over the art of record, at least for the following reasons.

With respect to claim 1, it recites in relevant parts:

5 a set of asset badges, wherein each of said set of asset badges is attached to a corresponding one of a first set of assets and transmits a corresponding badge identifier;

10 a plurality of intelligent badges, wherein each of said plurality of intelligent badges is attached to a corresponding one of a second set of assets and transmits a corresponding badge identifier, wherein said first set of assets and said second set of assets are comprised in said plurality of assets;

15 each of said plurality of intelligent badges receiving a corresponding one of a plurality of sets of badge identifiers, each of said plurality of intelligent badges sending said corresponding one of a plurality of sets of badge identifiers associated with a badge identifier of the intelligent badge, *wherein the badge identifiers in each set are sent together associated with the badge identifier of the intelligent badge even if the badge identifiers in the set are received at different time instances*; and

20 a processing system receiving and processing said plurality of sets of badge identifiers and corresponding identifiers of said intelligent badges to determine a location of each of said plurality of assets of interest.

(Amended Claim 1, *Emphasis Added*)

25 A tracking system in accordance with amended claim 1 contains intelligent badges, with each intelligent badge receiving a set of badge identifiers. Each intelligent badge sends the set of badge identifiers together along with the intelligent badge identifier even if the individual badge identifiers in the set are received at different time instances. The processing system processes such received sets to determine the location of each asset of interest.

30 Lareau does not disclose or suggest such a feature. While Lareau teaches "intermediate tags", they appear to operate differently based at least on the below disclosure of Lareau:

35 [0040] The asset monitoring system 100 provides for the communication between any wireless RF ID tag among a network of tags and the RMS 150. *In FIG. 2, the destination tag 110 is located far enough away from the RMS 150 that intermediate tags are required to relay any communication.* The system 100 facilitates communication from the tag 110 to the RMS 150 only after the RMS 150 has requested a communication. In this regard, the RF ID tags act as slaves to the RMS 150, the master. The RMS 150 can transmit a downstream

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5 communication to the destination tag 110 (coupled to an asset). *In the example illustrated in FIG. 2, the downstream communication is relayed from a first intermediate tag 130 (coupled to an asset) to a second intermediate tag 120 (coupled to an asset) to the destination tag 110.* The downstream communication, although containing the same payload, can be broken up into segments. The first downstream segment 101 is from RMS 150 to the first intermediate tag 130. The first intermediate tag 130 interprets the first downstream segment 101 and *relays* it along to the second intermediate tag 120 via a second downstream segment 103. The second intermediate tag 120 does the same and *relays* the communication along to the destination tag 110 via a third downstream segment 105. The destination tag 110 can process the downstream communication and reply with an upstream communication to the RMS 150. A first upstream segment 102 is received by the second intermediate tag 120 and relayed along to the first intermediate tag 130 via second upstream segment 104. A third upstream segment 106 is communicated to the RMS 150 from the first intermediate tag 130. *Once the network has been formed, the path in which a communication may travel can be determined by the RMS 150.*

10

15

(Paragraph 40 of Lareau, *Emphasis Added*)

20 From the above, it appears that the intermediate tags of Lareau would merely relay any communication from other tags. It is believed that 'relay' implies that the transmission occurs for each received communication immediately. In contrast, the intelligent badges of claim 1 send the set of badge identifiers together.

Therefore, Lareau does not disclose or suggest one or more features of amended claim 1. Claims 2-8, 16 and 17 are allowable at least as depending from allowable base claim 1.

25 New dependent claim 16 is independently allowable over Lareau at least as reciting that, "... a *physical location* of each of said set of badges is determined as *being in one or more of said intelligent physical zones by said processing of said processing system*" (*Emphasis Added*). In sharp contrast, Lareau appears to focus primarily on determining network path for communication to travel between RMS and each individual badges.

30 New dependent claim 17 is independently allowable over Lareau at least as reciting that each badge identifier is transmitted using a shorter range signal (e.g., infra-red), while intelligent badges use longer range (e.g., RF signals) in determining the location of the asset badges. By choosing shorter range signals advantages such as power efficiencies may be achieved with the

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more numerous asset badges, while choosing longer range signals enables the intelligent badges to be located sufficiently farther from the reader.

Amended claim 3 is independently allowable as determining the physical location of a common badge based on reception of the corresponding identifier in the sets received from two different intelligent badges (Emphasis Added). In sharp contrast, it is believed that the RMS of Lareau uses any information received from the intermediate badge to determine the paths (e.g., using shortest path algorithm) for relay, and not for determining the physical location as recited in amended claim 3.

Dependent claim 4 is also allowable independently in that the processing system determines the physical location of a first intelligent physical zone of a first intelligent badge from which the badge identifier of known location is received. The location of each assets in the first intelligent zone are thus received.

In other words, in accordance with dependent claim 4, a badge with a known location and a badge with an unknown location send corresponding identifiers to an intelligent badge. The zone of the intelligent badge (and thus the location of the assets within that zone) is then determined by the processing system.

It is believed that Lareau does not disclose such a feature. Even if "dummy ID 135 is interpreted as a reference badge ..." as asserted in Outstanding Office Action (See lines 19-21, page 3 of Outstanding Office Action), Lareau appears to use dummy ID 135 for relay communications (and not as in amended claim 4) based on the below disclosure:

[0039] In other embodiments, *a dummy wireless RF ID tag 135 may be used to relay communications between remote assets and the RMS 150*. The dummy wireless RF ID tag 135 is essentially the same as the wireless RF ID tags, except that it is not coupled to a mobile asset. The dummy wireless RF ID tag 135 may be positioned throughout the facility 70, *so as to provide better coverage when assets are spread sparingly throughout the facility 70*.
(Paragraph 39 of Lareau, *Emphasis Added*)

Lareau further discloses:

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[0045] Up until this point, only the relative position of each tag in the network could be calculated. However, an absolute location can also be established for each asset and can be stored in the tag. As mentioned earlier, forklifts are often used to move the assets in, out, and around the facility 70. Once placed at a location, the tag coupled to the particular asset can be programmed with the location. This may be done in a number of ways. One way is to track the location of the forklift that is moving the asset, for instance with an inertial navigation system (INS). Once the asset is placed, the location of the forklift established by the INS, as well as the position of the forklift tines (for height dimension), may be communicated to the tag of the asset. The coordinates (i.e., Cartesian, polar, or spherical) of the location can then be programmed into the memory of the tag. Alternatively, a handheld device, such as a personal desktop assistant, with a positioning system could be used to communicate the location of an asset to the asset. Other equivalent methods could be utilized as well to communicate the information to the asset. Once programmed, the asset may convey such information on the next successive communication with the RMS 150. In this manner, the location of tags in proximity to a tag with a known location can be also found. For example, *if a tag with an unknown location can communicate directly with a tag with a known location*, then the tag with the unknown location must be within range of the other tag. Using various techniques, the approximate location of the unknown tag can be more precisely found. For example, by finding another tag with a known location that the tag with the unknown location can communicate with can further approximate the location by using various geometry techniques. Obviously, the more tags with a known location, the more accurate the approximate location of the tags with an unknown location. In practice, it would seem likely that either all of the locations are known, or none of the locations are known. In the latter case, only the existence of the asset and the relative distance from the RMS 150 would be known.

(Paragraph 39 of Lareau, *Emphasis Added*)

Based on the above emphasized position, it is believed that Lareau contemplates communication from a tag from an known location directly to a tag with a known location to determine the absolute location of the tag with the unknown location. In contrast, as noted above, amended claim 4 does not require that the absolute location of intelligent badge need not be known before the processing by the processing system. Accordingly, claim 4 is believed to be allowable over Lareau.

With respect to dependent claim 6, it has been noted in the Outstanding Office Action:

Re claim 6, the limitations have been discussed above re the intermediate/dummy badges. Though the prior art is silent to component and

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active badges, the prior art teaches the use of intermediate and dummy badges to locate different objects in a system. Accordingly, it is understood that the location of the component badges is the same as the relative location of the active badge, in cases where the objects/assets are relatively close together. Simply providing names for assets, without functionally defining what the badges are, and why they are different, does not patentably distinguish the types of badges. The examiner has interpreted the different types of badges, as nothing more than badges of a different type (whether it be of a different type of object/asset, etc.). *The Examiner notes that if functional weight is desired to be given to the different tags/badges (asset/intelligent/component/active), that the claims need to be drawn to the specifics of what makes a badge a certain type of badge.*
(Line 22 Pg 3 - Line 10 Pg 4 of Outstanding Office Action, *Emphasis Added*)

Applicants respectfully traverse the rejection explaining that the emphasized requirement is met by claim 6, at least as sought to be amended. First, the text of relevant portion of amended claim 6 is noted:

a set of component badges, wherein said set of component badges are attached to corresponding one of a fourth set of assets; and

a set of active badges, wherein each of said set of active badges is attached to a corresponding one of a third set of assets, wherein said third set of assets and said fourth set of assets are contained in said plurality of assets,

wherein a first active badge receives a set of component badge identifiers from said set of component badges, wherein said set of component badge identifiers and a first active badge identifier is sent by said first active badge to a first intelligent badge contained in said plurality of intelligent badges, wherein said first active badge identifier identifies said first active badge and said first active badge is contained in said set of active badges,

wherein said processing system receives said first active badge identifier associated with said set of component badge identifiers from said first intelligent badge, said processing system determining the location of said first active badge by treating said first active badge identifier similar to each of said badge identifiers of said asset badges, wherein the approximate location of each of said fourth set of assets is same as the location of said first active badge, wherein said processing system determines the location of said set of component badges with reduced computational complexity.

(Amended Claim 6, *Emphasis Added*)

From the above, it is noted that the active badge is different from asset badges in that the (location of) asset badge represents the location of all the component badges for purposes of

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processing in processing system (thereby reducing processing requirements in determining the locations). The intelligent badges collect badge identifiers and forward the corresponding information (indicating the active badge identifier and the associated component badge identifiers) for further processing.

5 As emphasized above, by using only an active badge (along with other asset badges) to determine the physical location while processing, and determining that all component badges are in the same physical location as the active badge, the processing requirements in processing system are reduced.

10 Lareau does not disclose such a feature of grouping several component badges with a single active badge for the purpose of determining physical location. Accordingly, claim 6 is also believed to be allowable over the art of record. The remaining presented claims are also allowable at least for one or more reasons noted above.

15 Therefore, Applicant respectfully submits that all the objections/rejections of record are believed to be overcome, and all the claims presented for consideration are allowable over the art of record.

The Examiner is invited to telephone the undersigned representative if it is believed that an interview might be useful for any reason.

Respectfully submitted,



Date: July 14, 2005

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